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ABSTRACT

This survey of K-12 science education in Iowa presents descriptive statistics in the following areas: (1) organization of the K-12 educational systems - including a description of the school districts and governing systems; (2) teacher education and certification - including a survey of science teachers in Iowa and teacher preparation institutions; (3) the Iowa classroom teacher - describing the educational levels and teaching experiences of Iowa science teachers; (4) program of instruction - describing state requirements for science education in grades K-12; (5) inservice education - describing inservice programs for science teachers and the monies budgeted for this purpose; and (6) implications for programs for the improvement of elementary and secondary science education in Iowa - describing some of the concerns brought out by the statistics of this survey. One concern is that the large number of teacher preparation institutions in Iowa have widely different programs and produce teachers with widely different preparations. (MLH)

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SCIENCE EDUCATION CENTER

The University of Iowa

July 1975

technical report 6

K-12 Science Education in Iowa

by

Lynn W. Glass

The Technical Report Series

The Technical Report Series of the Science Education Center, University of Iowa, was established by action of the faculty during 1973. The series provides a mechanism for communicating results of research, developmental projects, and philosophical investigations to others in Science Education. The reports include details and supporting information not often included in publications in national journals.

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K-12 Science Education in Iowa

technical report 6

FORWARD

This paper was originally published in mimeograph with the title K-12 Science Education in Iowa with Implications for Programs for the Improvement of Elementary-Secondary Science Education in Iowa. At that time the author was a science education consultant at the Department of Public Instruction and an adjunct assistant professor of science education at The University of Iowa. The original paper was prepared as a position paper at the invitation of The National Science Foundation and read at a regional conference for the preparation of teachers of science and mathematics in St. Louis, Missouri, February 3-5, 1972. The position paper was to reflect the position of the author and was not necessarily to represent the official position of the author's employers.

Interest at the time of the original writing in the improvement of science teaching practices in the elementary and secondary schools was at a high level throughout the state and nation. Three years later there is still considerable interest at all levels in the improvement of instruction in the elementary and secondary schools. One indication of the degree of interest present for the improvement of instruction has been the number of requests for the original paper. Before the St. Louis conference was over the original printing had been exhausted. Additional copies were printed after the conference and to this date occasional requests come for copies of the paper.

The original paper has served as a data base for numerous federal and state grant requests at the turn of the decade. It has also served, in part, as a model for at least one federally funded science education improvement project. Perhaps more important than either of the above is the discussion, some positive, some negative, but all constructive, that the paper has precipitated.

The original position paper is being reprinted here with minor editorial changes so that it might be more readily accessible to science educators in Iowa and the nation. Another turn of the decade status report on K-12 science education in Iowa will permit us to assess our progress during the decade of the nineteen seventies.

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February 18, 1975

TABLE OF CONTENTS

		PAGE
LIST OF TABLES		v
LIST OF FIGURES		vii
I.	Organization of the K-12 Educational System	1
II.	Teacher Education and Certification	2
III.	The Iowa Classroom Teacher	4
IV.	Program of Instruction	6
V.	Inservice Education	6
VI.	Implications for Programs for the Improvement of Elementary-Secondary Science Education in Iowa	7

LIST OF TABLES

TABLE		PAGE
I	K-12 ENROLLMENT, AS OF SEPTEMBER, BY AREA COMMUNITY COLLEGE DISTRICTS FOR THE 1970-1971 SCHOOL YEAR	12
II	RANK ORDER OF EVERY 25th PUBLIC SCHOOL DISTRICT, BY ENROLLMENT, AS OF SEPTEMBER 11, 1970	14
III	PERCENTAGE OF TEACHERS PREPARED BY AREA OF CERTIFICATION IN EACH OF THE TWENTY-EIGHT TEACHER PREPARATION INSTITUTIONS IN IOWA FOR THE 1968-1969 ACADEMIC YEAR	15
IV	PERCENTAGE OF TEACHERS PREPARED BY AREA OF CERTIFICATION IN EACH OF THE TWENTY-EIGHT TEACHER PREPARATION INSTITUTIONS IN IOWA FOR THE 1969-1970 ACADEMIC YEAR	16
V	PERCENTAGE OF TEACHERS PREPARED BY AREA OF CERTIFICATION IN EACH OF THE TWENTY-EIGHT TEACHER PREPARATION INSTITUTIONS IN IOWA FOR THE 1970-1971 ACADEMIC YEAR	17
VI	OCCUPATION ON NOVEMBER 1, 1970 OF PERSONNEL WHO GRADUATED FROM IOWA COLLEGE AND UNIVERSITIES BETWEEN SEPTEMBER 1, 1969, AND AUGUST 31, 1970, WITH QUALIFICATIONS FOR THE PROFESSIONAL CERTIFICATE	18
VII	NUMBER AND PERCENTAGE OF TEACHERS EMPLOYED WITH TEMPORARY TEACHER CERTIFICATES BY K-12 ENROLLMENT SIZE CATEGORIES, 1969-1970 SCHOOL YEAR	19
VIII	PREPARATION BY HIGHEST DEGREE OF ALL CLASSROOM TEACHERS, IN GRADES K-12, IN IOWA PUBLIC SCHOOLS AS A PERCENT OF THE CLASSROOM TEACHERS IN EACH ENROLLMENT SIZE CATEGORY, 1969-1970 SCHOOL YEAR . .	20

TABLE		PAGE
IX	PREPARATION BY HIGHEST DEGREE OF ALL SCIENCE TEACHERS, GRADES 7-12, IN IOWA PUBLIC HIGH SCHOOLS AS A PERCENT OF ALL TEACHERS IN EACH SUBJECT MATTER AREA, 1969-1970 SCHOOL YEAR	21
X	TOTAL PROFESSIONAL EDUCATIONAL EXPERIENCE OF ALL CLASSROOM TEACHERS IN IOWA PUBLIC HIGH SCHOOL DISTRICTS AS A PERCENT OF THE CLASSROOM TEACHERS IN EACH ENROLLMENT SIZE CATEGORY, 1969-1970 SCHOOL YEAR	22
XI	PERCENT OF IOWA PUBLIC HIGH SCHOOLS OFFERING UNITS IN SCIENCE, GRADES 9-12, BY ENROLLMENT SIZE CATEGORIES, 1970-1971 SCHOOL YEAR	23
XII	PERCENTAGE OF STUDENTS IN GRADES 9-12 IN IOWA PUBLIC HIGH SCHOOLS ENROLLED IN SCIENCE COURSES FOR THE SCHOOL YEARS 1958-1959 THROUGH 1970-1971 .	24
XIII	ENROLLMENT TRENDS IN SELECTED SCIENCE COURSES AS A PERCENTAGE OF TOTAL 9-12 PUBLIC SCHOOL ENROLLMENT FOR THE SCHOOL YEARS 1958-1959 THROUGH 1970-1971 .	25
XIV	PERCENT OF IOWA SCHOOL DISTRICTS BUDGETING MONEY FOR INSERVICE TEACHER EDUCATION, BY ENROLLMENT SIZE CATEGORIES, 1969-1970 SCHOOL YEAR	26

LIST OF FIGURES

FIGURE		PAGE
I	AREA COMMUNITY COLLEGE AND AREA VOCATIONAL SCHOOL DISTRICTS	13
II	COLLEGES AND UNIVERSITIES IN IOWA WITH GRADUATE EDUCATION PROGRAMS	27

The State of Iowa encompasses 56,280 square miles of rolling farmland and is approximately 225 miles from border-to-border in a north-south direction and 340 miles from border-to-border in an east-west direction. The state had an estimated population in 1970 of 2,789,000 and a population density of 50 persons per square mile.

I. Organization of the K-12 Educational System

The state is divided into 15 area community college--vocational school districts. Each area has a local board of education and the authority to levy taxes. The total K-12 enrollment ranges from a low of 16,876 in Area XIV to a high of 136,719 in Area XI (Table I)*. In general, these 15 areas are of approximately the same geographical size (Figure I).

All 15 areas come under the jurisdiction of the State Department of Public Instruction. Certain psychological and media services are provided each school within every area. Within three of these areas (Area V, IX, and X) some of the counties have merged to provide free consultative help in the subject-matter areas for the public elementary and secondary schools.

The State is further divided into 452 local K-12 districts. Each district is governed by a local board. Over 300 of these

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* Data selected for this report were from the most recent year or years available at the time of the 1972 St. Louis conference.

districts have fewer than 1,000 students. The largest school district is the Des Moines Independent Community School District with a K-12 enrollment of over 45,000 students. The second largest is the Cedar Rapids Community School District with a K-12 enrollment of over 25,000 students. The smallest school district has 172 students. An enrollment rank order listing of every 25th school district is included in Table II.

Only 13 of Iowa's 452 school districts have support personnel in science on either a full- or part-time basis. The 13 school districts employing support personnel in science are among the state's largest 18 school districts. In addition to these 13 districts, several districts employ a K-12 subject-matter generalist.

II. Teacher Education and Certification

Iowa is one of the states that recognize the "approved program" approach to teacher education and certification. An Iowa teacher's certificate is issued to any person who has completed an approved baccalaureate--or graduate-degree teacher-education program, including supervised student teaching.

This means that an individual must complete an institution's approved program of preparation and be recommended by the institution for the type of certification sought in Iowa. A wide array of educational experiences between individuals is suggested with this approach to certification.

In Iowa there are 28 approved teacher preparation institutions. Two of the 28 institutions, Grinnell and Loras, do not have approved elementary teacher preparation programs. Four universities--Drake University, Iowa State University, The University of Iowa, and The University of Northern Iowa--prepare approximately fifty-five percent of the teachers who are certified to teach science in either the elementary or secondary school (Table III, IV and V). Approximately 75 percent of these teacher education graduates go directly into teaching upon graduation (Table VI).

Classroom teachers in grades K-8 usually hold a general elementary certificate, whereas classroom teachers in grades 7-12 hold a general secondary certificate with approval in one or more of the following subject-matter areas: biology, chemistry, general science, physical science, physics, and physiology, or all sciences. The only basic requirement that is made upon the college or university for all candidates of the general elementary certificate is that every candidate must have had a methods course and supervised student teaching. Although not required, it is strongly recommended by the State Department of Public Instruction that every candidate have a course in elementary science methods or a combination elementary science/mathematics methods course. Candidates for the secondary certificate are required to have at least a 30 semester hour major in one academic area with supporting work in related fields; for example, a 30 semester hour major in biology with

supporting work, consisting of at least two courses, in chemistry. In addition, a methods course and supervised student teaching are required.

Approximately three percent of all Iowa classroom teachers are teaching with temporary certificates (Table VII). These certificates are issued for a variety of reasons. The most common reason today for issuing a temporary certificate is that the applicant has less than a baccalaureate degree.

III. The Iowa Classroom Teacher

In general, the teachers in Iowa's public schools are at the level of the baccalaureate degree. There are, however, some interesting patterns evident in the various size groupings of school districts (Table VIII). All school districts, regardless of size, have approximately 74 percent of their teachers at the baccalaureate level; however, it is only the larger school districts where a significant number of teachers (22.6 percent) have achieved the master's degree level. The converse of this is also true; it is only in the smaller school districts where a significant number of teachers (23.5 percent) have not obtained the baccalaureate degree.

It should be noted that 11.2 percent (3,652 teachers) of all classroom teachers have not received a bachelor's degree. This percentage appears to be in direct conflict with the number of temporary certificates reported in Table VII. However, prior to August 31, 1958, prospective elementary teachers with less than a

baccalaureate degree were issued pre-professional or standard elementary life certificates; these certificates, although still in use, are no longer issued and they account for the apparent discrepancy.

Data are available concerning the academic preparation of science teachers in grades 7-12 (Table IX). As might be predicted, these data closely parallel those data presented in Table VIII for all classroom teachers in the state. Fewer than one percent of all secondary science teachers have not received the baccalaureate degree and fewer than one percent have advanced beyond the master's degree level of education.

The total number of years of teaching experience does not appear to be related to district size. Approximately one-third of all classroom teachers in Iowa public schools have fewer than five years of total teaching experience; approximately one-third of the classroom teachers have from five to 14 years of total teaching experience; and approximately one-third of all classroom teachers have more than 14 years of total teaching experience (Table X).

Data in Table VIII reveal an interesting comparison. Where 22.6 percent of all classroom teachers in the largest districts have earned a master's degree only 5.8 percent of all classroom teachers in the smallest districts have earned a master's degree; yet the largest districts and smallest districts have approximately the same percentage of classroom teachers in each experience bracket.

IV. Program of Instruction

The Code of Iowa requires that a minimum of four units of science shall be taught in grades 9-12 each year; 97.2 percent of the high schools in Iowa meet the minimum requirement. The number of units of science instruction appears to be an inverse function of the size of the school district (Table XI). Over 82 percent of the districts in the smallest size class offer fewer than five units of science instruction per year, whereas over 86 percent of the districts in the largest size class offer five or more units of science instruction per year.

The percentage of all students in grades 9-12 enrolled in science courses for any given school year has remained roughly constant (Table XII). Stability in the science enrollment might be expected since the number of courses a student may enroll in is directly related to the length of the school day. Enrollment trends in selected science courses during this same 13 year period (Table XIII) indicate that while the biology and chemistry enrollments have remained fairly constant the enrollment in physics has dropped and the enrollments in earth science and physical science have increased correspondingly.

V. Inservice Education

According to Educational Standard 3.9 each school district is to have in effect a continuous inservice program for teachers. All school districts indicate that they comply with this standard;

however, the amount of money budgeted for inservice education in all areas ranges from no monies budgeted in 12.6 percent of the schools to over $1,000.00 budgeted in 24.6 percent of the schools (Table XIV). Local school districts in areas where joint county units have been formed (Area V, IX and X) supplement their inservice budget with tax supported consultants in science. All districts in the state may utilize the services of the one state science consultant within the limited time available.

In addition to inservice education provided through the local school system, many teachers return to colleges and universities to continue their educational pursuits. Of the 28 teacher training institutions in the state, eight offer an approved graduate education program (Figure II). Only four of these eight institutions (Drake University, Iowa State University, The University of Iowa, and The University of Northern Iowa) have professional science educators on their faculties and offer graduate credit in science education. It can be assumed that most teachers continue their work at these institutions, or similar out-of-state institutions, because of the structure of local salary schedules.

VI. Implications for Programs for the Improvement of Elementary-Secondary Science Education in Iowa

The data presented appears to fall into two general areas of concern. One area being the large number of teacher preparation programs and another area being the large number of small school districts. Both of these areas present their own unique problems

to the improvement of elementary-secondary science education in Iowa.

Due to the large number of teacher preparation institutions the preservice background of the teachers in Iowa is undoubtedly as varied as the institutions in which they are prepared. This in itself is not altogether bad; in fact, it probably lends strength to the total elementary-secondary education program in Iowa.

It is, however, unfortunate that in many of the teacher preparation institutions the preservice teacher is never once exposed to the many science curriculum projects that have been developed with the financial support of the National Science Foundation during the past fifteen years. This statement is at least partially substantiated by the number of generalists attending the Department of Public Instruction-Iowa State University Conference on preservice education for teachers of science and mathematics who were not conversant with the terminology or names of the many elementary science programs developed with the financial assistance of the National Science Foundation.

Student teaching and the supervision of student teaching (both required activities for certification) vary widely from institution to institution. In some institutions the student teacher meets weekly with a specialist; in other institutions supervision is left up to a generalist who may only visit with the student teacher once or twice during the entire student teaching experience.

No amount of inservice education will remedy the ills created by this "patchwork" of preservice education programs.

Some mechanism needs to be developed to improve the preservice professional education of every candidate for certification. This mechanism should not destroy or eliminate the unique nature of the various preservice programs in each teacher training institution but should strengthen the individual programs. Perhaps one way to improve the preservice teacher education in every college and university in the state would be through the establishment of Staff Development Centers.

One of these centers could be established in each of the 15 area community college--vocational school districts within the state. Each center could be operated in conjunction with an exemplary school where professional education would grow from the instructional problems of children. Student teaching would be the central focus of the teacher-training program. The professional curriculum would be tailored to each individual and would be so organized that every student, during his stay at the Staff Development Center, would be involved simultaneously in a stream of student-teaching experiences and in a concurrent stream of theoretical seminars, both taught by a team of instructors working with a particular group of student teachers. The staff for these centers would be drawn from the various college and university faculties throughout the state and coordinated through a central office. The Staff Development Center would have the advantage of being close to the schools yet removed one step from the politics of the local school system.

The Staff Development Center could be run by a consortium of four groups:

1. Colleges and universities.
2. Local school systems including administration, board of education and community representatives.
3. Teachers represented through their professional organizations.
4. The State Department of Public Instruction.

These four groups might collectively determine the nature of the preservice professional education of all candidates for teacher certification in Iowa. This idea might not be so far fetched; the states of Washington and New York already are moving in this direction and the State Advisory Committee on Teacher Education and Certification in Iowa will consider such a plan during its February meeting.

In summary this is saying that all candidates for teacher certification regardless of what institution they selected to receive their liberal arts education should receive their professional education in a center staffed by specialists. A plan of this nature would preserve the heterogenity of the liberal arts background received in the 28 institutions yet it would place professional education into the hands of selected specialists working under the direction of a local consortium.

The Staff Development Center concept, as previously mentioned, also plays a vital role in inservice education. Inservice

education programs are a necessary part of the professional commitment to education of every school district. There are as the data indicate, some reasons for establishing inservice education centers to meet the needs explicitly of the small school districts in Iowa. As will be recalled, it is the smaller districts that have the highest percentage of non-degree teachers and no support personnel. These school districts need to have qualified personnel working with them on a day-to-day basis. This can only be achieved through an intermediate agency such as a Staff Development Center.

Teachers and administrators would continue their professional development in science education, as well as in other disciplines, through a variety of activities conducted by the professional staff at each Center. Continuous ongoing programs designed to meet a variety of needs would be offered. These programs would be designed to (1) help school districts implement a variety of new and innovative science education programs, (2) focus on the improvement of the teacher's content background, and/or (3) cut across discipline lines and center on pedagogy. A series of interesting and provocative seminars would supplement the regular inservice programs.

With the new approach for teacher certification that is being considered in Iowa it may not be necessary for these courses to fit into the "traditional" college credit format. Instead, the State Advisory Committee on Teacher Education and Certification is suggesting that if the Department of Public Instruction is involved in the planning of inservice education programs that these programs be acceptable for teacher certificate renewal.

TABLE I

K-12 ENROLLMENT, AS OF SEPTEMBER, BY AREA COMMUNITY COLLEGE DISTRICTS FOR THE 1970-1971 SCHOOL YEAR

Area	K-12 Enrollment			Rank
	Public	Non-Public	Total	
I	46,564	16,229	62,793	4
II	32,997	1,963	34,960	10
III	19,511	2,897	22,408	13
IV	14,630	4,058	18,688	14
V	41,315	3,533	44,848	7
VI	24,655	480	25,135	12
VII	49,821	5,602	55,423	5
IX	65,321	6,350	71,671	3
X	74,982	6,249	81,231	2
XI	125,233	11,486	136,719	1
XII	38,810	5,750	44,560	8
XIII	44,260	2,673	46,933	6
XIV	16,734	142	16,876	15
XV	35,084	591	35,675	9
XVI	25,323	2,764	28,087	11
No Area*	4,329	350	4,679	
TOTAL	659,569	71,117	730,686	

* Since these data were reported all areas of the state have been assigned to one of the 15 community college districts.

FIGURE I

AREA COMMUNITY COLLEGE AND AREA VOCATIONAL SCHOOL DISTRICTS

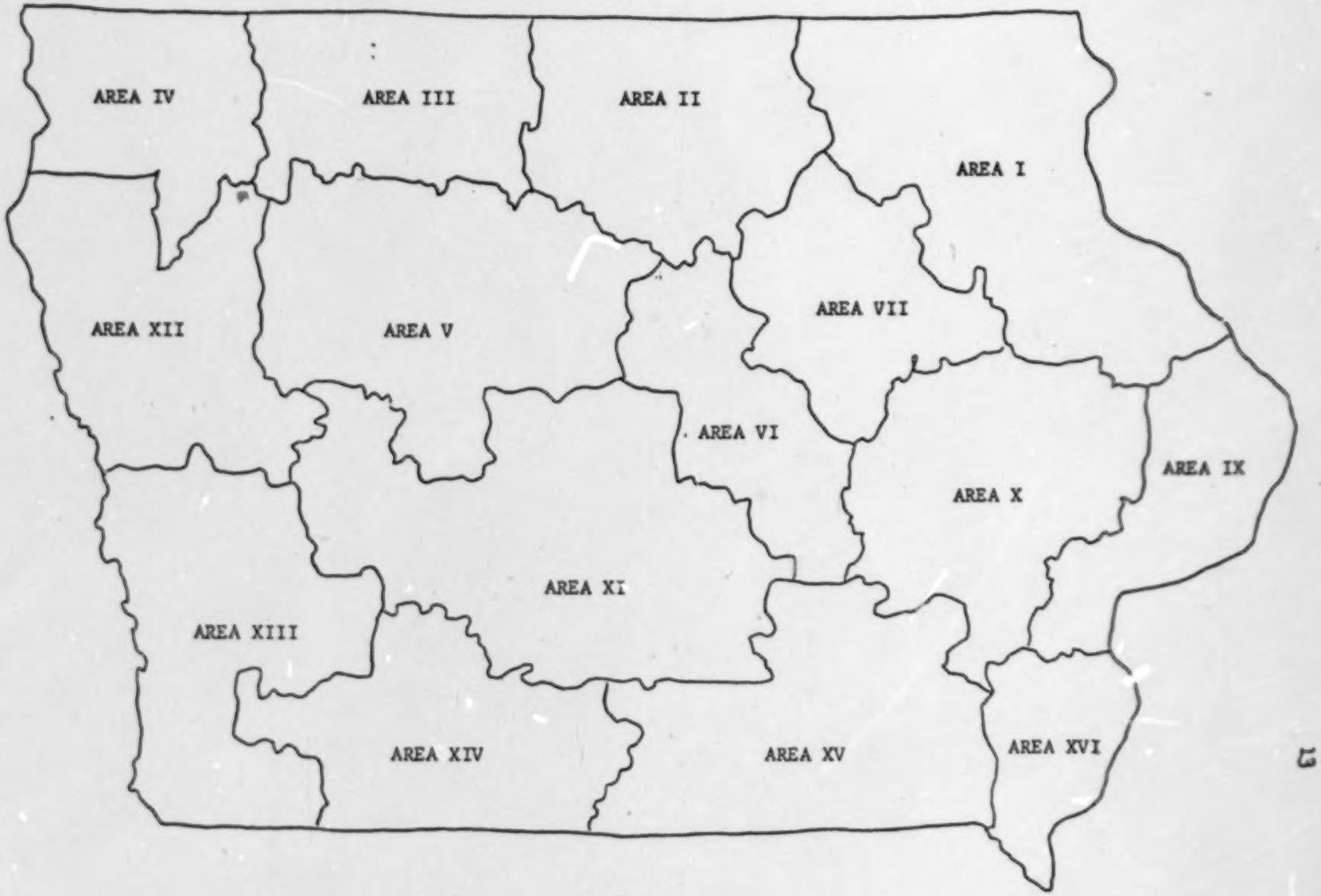

TABLE II

RANK ORDER OF EVERY 25th PUBLIC SCHOOL DISTRICT,
BY ENROLLMENT, AS OF SEPTEMBER 11, 1970

Rank	Enrollment
1	45,216
25	3,272
50	2,345
75	1,869
100	1,327
125	1,140
150	996
175	901
200	811
225	737
250	672
275	610
300	555
325	513
350	463
375	404
400	359
425	309
450	221

TABLE III

PERCENTAGE OF TEACHERS PREPARED BY AREA OF CERTIFICATION IN EACH OF THE TWENTY-EIGHT TEACHER PREPARATION INSTITUTIONS IN IOWA FOR THE 1968-1969 ACADEMIC YEAR

Institution	Area of Certification						Total %
	Elem.	Secondary					
		Science	General Science	Biology	Chem.	Physics	
Briar Cliff	3.0%			1.8%			2.8%
Buena Vista	1.8			0.9			1.7
Central	1.9	4.2%		1.8			1.9
Clarke	1.6			0.9			1.5
Coe	1.6			0.9			1.1
Cornell	0.9			1.8	4.3%		1.0
Dordt	2.1			4.5	8.7		2.3
Drake	16.9			4.5	30.4		15.8
Graceland	1.8		8.3%	1.8			1.8
Grinell				0.9		15.4%	0.2
Iowa State University	5.9			22.3	4.3	15.4	6.8
Iowa Wesleyan	1.5					7.7	1.4
Loras			4.2	0.9	4.3		0.2
Luther	3.8			6.3	8.7		3.8
Marycrest	2.8			2.7			2.7
Morningside	1.3			0.9			1.2
Mount Mercy							
Northwestern	1.8	4.2		1.8			1.7
Parsons	8.7			7.1			8.2
St. Ambrose	0.1			1.8		7.7	0.3
Simpson	1.1				4.3		1.0
University of Northern Iowa	15.4			13.4	30.4	38.5	15.3
University of Iowa	15.7	87.5	70.8				16.1
University of Dubuque	0.7			8.0	4.3		1.1
Upper Iowa University	1.5			5.4		7.7	1.7
Wartburg	2.1		8.3	7.1			2.4
Westmar	2.2	4.2		2.7		7.7	2.8
William Penn	4.4		8.3				4.1
TOTAL number of teachers	1,651	24	24	112	23	13	1,847

TABLE IV

PERCENTAGE OF TEACHERS PREPARED BY AREA OF CERTIFICATION IN EACH OF THE TWENTY-EIGHT TEACHER PREPARATION INSTITUTIONS IN IOWA FOR THE 1969-1970 ACADEMIC YEAR

Institution	Area of Certification						Total %
	Elem.	Secondary					
		Science	General Science	Biology	Chem.	Physics	
Briar Cliff	2.9%			3.2%	6.3%		2.8%
Buena Vista	1.2	14.8%					1.5
Central							
Clarke	0.2			3.2	6.3		0.4
Coe	0.9						0.8
Cornell	1.2			2.4			1.2
Dordt	3.1		2.6%	3.2			3.0
Drake	19.8			4.0	25.0		17.9
Graceland	2.3			0.8	6.3		2.1
Grinnell				0.8			0.1
Iowa State University	9.6		41.0	28.2	31.3	33.3%	11.3
Iowa Wesleyan							
Loras				0.8	6.3	6.7	0.1
Luther	3.8			6.5		6.7	3.8
Marycrest	3.1	3.7		1.6			2.9
Morningside	1.8			3.2			1.8
Mount Mercy	1.6			1.6			1.5
Northwestern	1.1	5.6		2.4			1.2
Parsons							
St. Ambrose	0.6		2.6	0.8			0.6
Simpson	1.1			4.0			1.2
University of Northern Iowa	20.7		51.3	15.3	18.8	40.0	20.6
University of Iowa	15.4	61.1					15.1
University of Dubuque	1.5			1.6		6.7	1.4
Upper Iowa University	1.6			7.3			1.8
Wartburg	2.9		2.6	5.6		6.7	2.9
Westmar	1.4	14.8		3.2			1.7
William Penn	2.2						2.0
TOTAL number of teachers	1,924	54	39	124	16	15	2,172

TABLE V

PERCENTAGE OF TEACHERS PREPARED BY AREA OF CERTIFICATION IN EACH OF THE TWENTY-EIGHT TEACHER PREPARATION INSTITUTIONS IN IOWA FOR THE 1970-1971 ACADEMIC YEAR

Institution	Area of Certification						Total %
		Secondary					
	Elem.	Science	General Science	Biology	Chem.	Physics	
Briar Cliff	2.6%		4.0%	1.4%			2.4%
Buena Vista	1.5		4.0	4.3			1.6
Central	1.7	3.7%		0.7			1.7
Clarke	2.4			3.6	3.2%		2.4
Coe	0.9		8.0	0.7	3.2		1.0
Cornell	0.8					7.7%	0.7
Dordt	2.7			2.2	3.2	7.7	2.6
Drake	12.4	9.3	12.0	2.9	12.9		11.7
Graceland	1.9			3.6	3.2		1.9
Grinnell				2.9	3.2		0.2
Iowa State University	9.7		44.0	23.2	29.0	23.1	10.9
Iowa Wesleyan	2.8			5.8			2.2
Loras				4.3			0.3
Luther	3.3			2.2			3.1
Marycrest	2.8			1.4			2.5
Morningside	2.2		4.0	0.7	6.5	15.4	2.3
Mount Mercy	1.9			2.2			1.7
Northwestern	1.6		8.0	4.3	3.2		1.6
Parsons	2.3		4.0	1.4	3.2		2.4
St. Ambrose	0.8			0.7		7.7	0.8
Simpson	1.4	1.9		19.6			1.3
University of Northern Iowa	19.7	33.3			19.4	30.8	19.8
University of Iowa	15.9	51.9					15.3
University of Dubuque	1.1			0.7	3.2		1.0
Upper Iowa University	1.5			5.8			1.6
Wartburg	2.8		4.0	5.1	3.2	7.7	2.9
Westmar	1.3		4.0	0.7	3.2		1.3
William Penn	2.9						2.6
TOTAL number of teachers	2,121	54	25	138	31	13	2,382

TABLE VI

OCCUPATION ON NOVEMBER 1, 1970, OF PERSONNEL WHO GRADUATED FROM IOWA COLLEGE AND UNIVERSITIES BETWEEN SEPTEMBER 1, 1969, AND AUGUST 31, 1970, WITH QUALIFICATIONS FOR THE PROFESSIONAL CERTIFICATE

	Elementary	Secondary	Total Elementary & Secondary
Teaching			
In State	61.6%	46.9%	52.4%
Out of State	24.5	21.1	22.4
Not Teaching*	11.4	29.0	22.3
Seeking Teaching Position**	2.6	3.0	2.8
TOTAL NUMBER	2,027	3,334	5,361

* Includes: otherwise gainfully employed, graduate school, military service, and homemaking.

** Usually in restricted area because of family obligation.

TABLE VII

NUMBER AND PERCENTAGE OF TEACHERS EMPLOYED WITH TEMPORARY TEACHER CERTIFICATES BY K-12 ENROLLMENT SIZE CATEGORIES, 1969-1970 SCHOOL YEAR

K-12 Enrollment	No. of Districts	No. of Teachers	Teachers with Temporary Certificates	
			Number	Percentage
200-499	114	2,717	163	6.00%
500-749	121	4,230	181	4.27
750-999	64	2,967	106	3.57
1000-1499	63	3,695	83	2.24
1500-1999	20	1,681	36	2.14
2000-2999	43	4,783	132	2.76
Over 3000	28	12,466	236	1.89
TOTAL	453*	32,539	937	2.88%

* Since these data were reported, two districts have merged resulting in a total of 452 school districts in the State of Iowa.

TABLE VIII

PREPARATION BY HIGHEST DEGREE OF ALL CLASSROOM TEACHERS, IN GRADES K-12, IN IOWA PUBLIC SCHOOLS AS A PERCENT OF THE CLASSROOM TEACHERS IN EACH ENROLLMENT SIZE CATEGORY, 1969-1970 SCHOOL YEAR

Enrollment K-12	Doctor	Spec.	Master	Bachelor	None	No. of Teachers
200-499	0.04%	0.06%	5.8%	70.6%	23.5%	2,717
500-749	0.05	0.05	6.8	73.0	20.1	4,230
750-999	0.03	0.03	8.6	74.7	16.6	2,967
1000-1499	0.05	0.08	8.7	76.9	14.2	3,695
1500-1999	0.06		12.7	74.0	13.2	1,681
2000-2999	0.06	0.04	14.9	75.1	9.9	4,783
3000 & Up	0.07	0.17	22.6	73.6	3.6	12,466
TOTAL	0.06%	0.1 %	14.7%	74.0%	11.2%	32,539

TABLE IX

PREPARATION BY HIGHEST DEGREE OF ALL SCIENCE TEACHERS, GRADES 7-12, IN IOWA PUBLIC HIGH SCHOOLS AS A PERCENT OF ALL TEACHERS IN EACH SUBJECT MATTER AREA, 1969-1970 SCHOOL YEAR

Subject	Percentage with highest degree earned					Number of Teachers
	Doctor	Spec.	Master	Bachelor	None	
Non BSCS Biology		0.2%	28.1%	71.7%		573
BSCS Biology			41.1	58.9		73
General Physics	0.5%		34.1	65.2	0.3%	399
PSSC Physics			43.9	56.1		41
Project Physics			80.0	20.0		5
General Chem.	0.2		33.8	65.5	0.5	429
CHEMS and CBA			41.7	58.3		60
General Science			20.1	79.2	0.7	298
Science	0.2		20.3	77.7	1.8	488
Science/Health			10.9	78.3	10.9	46
Physical Science	0.2	0.2	25.9	73.6		428
All Science	0.4%	0.1%	28.5%	70.3%	0.9%	2,249

TABLE X

TOTAL PROFESSIONAL EDUCATIONAL EXPERIENCE OF ALL CLASSROOM TEACHERS IN IOWA PUBLIC HIGH SCHOOL DISTRICTS AS A PERCENT OF THE CLASSROOM TEACHERS IN EACH ENROLLMENT SIZE CATEGORY, 1969-1970 SCHOOL YEAR

Years of Total Experience	District Size K-12							All Schools
	200-499	500-749	750-999	1000-1499	1500-1999	2000-2999	3000 Over	
0-1	20.0%	19.5%	19.4%	18.6%	16.2%	17.0%	19.4%	18.8%
2	6.5	6.3	6.6	6.6	6.2	6.5	6.8	6.6
3	5.7	6.0	5.0	5.3	5.2	5.5	6.3	5.8
4	5.0	4.8	5.3	5.5	4.8	5.4	5.0	5.1
5-9	18.4	20.5	20.7	21.4	21.6	20.9	17.9	19.6
10-14	15.0	14.2	14.0	13.2	14.8	13.6	12.7	13.5
15-19	11.6	10.1	10.7	10.6	10.5	11.0	10.0	10.5
20-24	6.9	7.1	7.8	7.4	7.7	8.2	7.0	7.3
25-29	5.0	5.0	4.7	5.5	5.7	4.7	5.3	5.1
30-34	3.2	3.3	2.7	2.5	3.7	3.5	3.9	3.4
35-39	1.3	1.6	1.8	2.1	1.8	2.0	2.9	2.2
40-44	0.9	1.1	1.1	0.9	1.5	1.4	2.4	1.6
45-49	0.3	0.4	0.2	0.4	0.2	0.2	0.4	0.4
50 Up	0.2	0.1	0.03	0.02	0.06	0.06	0.03	0.06
Number of Teachers	2,717	4,230	2,967	3,695	1,681	4,783	12,466	32,539

TABLE XI

PERCENT OF IOWA PUBLIC HIGH SCHOOLS OFFERING UNITS IN SCIENCE, GRADES 9-12, BY ENROLLMENT SIZE CATEGORIES, 1970-1971 SCHOOL YEAR

Enrollment K-12	Number of districts	Number of Units Offered								Median number units	Mean number units
		Less Than 4.0	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	8.0-8.9	9.0-9.9	10 & over		
200-499	123	6.5%	75.7%	15.4%	1.6%	0.8%				4.0	4.18
500-749	111	2.7	51.3	37.9	8.1					4.0	4.55
750-999	70	1.4	51.5	37.2	8.5	1.4				4.5	4.59
1000-1499	59	1.6	45.8	28.9	13.6	8.4	1.6%			5.0	4.92
1500-1999	23		17.4	56.6	21.7		4.3			5.0	5.22
2000-2999	38		28.9	34.3	21.1	13.1		2.6%		5.0	5.38
3000 Over	29		13.8	17.2	31.0	13.8	10.4	3.4	10.4%	6.0	6.74
Public	453	2.8%	51.3%	29.9%	10.4%	3.5%	1.1%	0.4%	0.6%	4.0	4.75

Minimum

TABLE XII

PERCENTAGE OF STUDENTS IN GRADES 9-12 IN IOWA PUBLIC HIGH SCHOOLS ENROLLED IN SCIENCE COURSES FOR THE SCHOOL YEARS 1958-1959 THROUGH 1970-1971

School Year	Total 9-12 public school enrollment*	Total 9-12 science enrollment*	Science enrollment as percent of total
58-59	136,704	80,545	58.9%
59-60	13 ,086	75,393	55.0
60-61	139,568	79,293	56.8
61-62	150,256	84,506	56.2
62-63	159,562	92,129	57.7
63-64	170,020	105,604	62.1
64-65	177,283	103,729	58.5
65-66	179,898	103,871	57.7
66-67	183,163	- - - -	- - -
67-68	186,787	- - - -	- - -
68-69	190,339	113,366	59.6
69-70	191,705	121,664	63.5
70-71	193,437	111,760	57.8
	Mean percent enroll.	--	58.7%

* At beginning of school year

NOTE: Science enrollments are not available for 1966-1967 and 1967-1968 school years.

TABLE XIII

ENROLLMENT TRENDS IN SELECTED SCIENCE COURSES AS A PERCENTAGE OF TOTAL 9-12 PUBLIC SCHOOL ENROLLMENT FOR THE SCHOOL YEARS 1958-1959 THROUGH 1970-1971

School Year	Physics	Biology	Chemistry	Earth Science	Physical Science
58-59	7.2%	22.0%	8.0%	.1%	.4%
59-60	6.4	20.5	7.9	.1	.9
60-61	5.8	21.0	8.2	.2	1.4
61-62	5.2	21.2	7.6	.2	2.0
62-63	4.1	23.5	8.4	.7	2.7
63-64	4.7	22.5	11.6	.9	3.5
64-65	5.1	21.6	8.4	1.0	6.2
65-66	4.3	22.1	8.9	2.2	5.6
66-67	---	----	----	---	----
67-68	---	----	----	---	----
68-69	4.0	22.8	8.5	5.7	10.5
69-70	3.9	23.8	8.3	4.3	9.0
70-71	3.9	23.1	8.0	4.9	11.5

NOTE: Data are not available for the 1966-1967 and 1967-1968 school years.

TABLE XIV

PERCENT OF IOWA SCHOOL DISTRICTS BUDGETING MONEY FOR INSERVICE TEACHER EDUCATION, BY ENROLLMENT SIZE CATEGORIES, 1969-1970 SCHOOL YEAR

Amount budgeted for inservice education	Enrollment K-12							TOTAL
	200-499	500-749	750-999	1000-1499	1500-1999	2000-2999	3000 Over	
None	14.0%	12.4%	15.6%	12.7%	5.0%	14.1%	3.6%	12.6%
$1-$99	1.8	3.3		3.2				1.8
$100-$199	13.2	11.6	6.3	7.9		2.3		8.6
$200-$299	30.7	21.5	26.6	14.3	5.0	4.7	3.6	19.9
$300-$399	16.7	4.1	9.4	6.3	5.0	4.7		11.5
$400-$499	7.9	9.1	6.3	3.2		4.7		4.9
$500-$599	5.3	3.3	12.5	7.9	10.0	2.3	3.6	7.5
$600-$699	0.9		1.6	6.3	10.0	2.3		2.0
$700-$799	2.6	3.3	3.1	3.2	10.0	2.3		3.1
$800-$899	0.9	4.1	1.6	1.6	5.0	2.3	3.6	2.4
$900-$999			1.6	1.6	5.0	4.7		1.1
$1000-Up	6.0	14.9	15.6	31.8	45.0	55.9	85.6	24.6
Median	$225	$300	$300	$500	$850	$1,000	$5,250	$281
Number of Districts	114	121	64	63	20	43	28	453

FIGURE II

COLLEGES AND UNIVERSITIES IN IOWA WITH
GRADUATE EDUCATION PROGRAMS